WNV and other Arbovirus Activities to Date in Mississippi

In 1975, Mississippi experienced one of the most severe epidemics of human arbovirus infections ever experienced within the United States. Of 229 laboratory confirmed St. Louis encephalitis virus (SLE) cases, there were 36 deaths. Cases occurred in 42 of the 82 counties, 60% of which were in four counties alone. The statewide attack rate for SLE reached 10.3 per 100,000, and for the town where the majority of the cases occurred, the attack rate reached 215.6 per 100,000. These rates are among the highest ever reported for SLE. Other arboviruses detected in humans in MS have included Eastern Equine encephalitis (EEE), LaCrosse encephalitis (LAC), and the California group, Jamestown Canyon virus (JC). In 1999, a large outbreak of EEE occurred among the equine and ratite populations. Thirty-eight laboratory-confirmed cases were reported in 20 counties, with numerous anecdotal reports from field veterinarians. No human cases of EEE were reported.
The summer of 1999, West Nile virus, a mosquito-borne disease never before reported in the Western hemisphere, caused encephalitis in 62 people and numerous horses in the New York City and Long Island area. There were 7 human and over 10 equine deaths. Birds are the natural hosts for the virus, which can be transmitted from infected birds to humans and other animals through the bites of infected mosquitoes. Scientists and public health officials are concerned WNV may spread to other areas of the country, and have encouraged states to increase ongoing surveillance activities for WNV and other arboviruses.

Since birds are the natural host for WNV, an unusual characteristic noted for WNV is that it causes high mortality among infected birds, especially crows. Thus, dead crows have been an important surveillance mechanism for identifying geographic areas of viral activity. Crows do not migrate, so they will not be directly responsible for the spread of the virus from the Northeastern United States to other areas. It is possible that other avian species that do migrate may cause direct spread, or that gradual spread may occur through mosquitos and local birds.

In response to the request for increased surveillance; The MSDH was recently awarded a substantial grant from the CDC to enhance WNV and other arbovirus surveillance. Surveillance activities will include but not be limited to the following:

HUMAN TESTING - The MSDH has purchased the lab equipment and manpower necessary to perform human arbovirus testing at the State Health Laboratory.

All human samples will be tested for West Nile virus, St. Louis encephalitis, eastern equine encephalitis, and LaCrosse encephalitis free of charge. Serum is the specimen of choice, but cerebral spinal fluid can be tested as well. Two of our medical laboratory technicians were sent to the arboviral division of the CDC in Ft. Collins to receive expert training for the proper use of the equipment.

A new medical lab technician is being hired to accommodate the expected increased work load. All clinicians within the state have been encouraged to send samples from suspect encephalitis, meningoencephalitis, or meningitis cases to the MSDH to help obtain an appropriate diagnosis.

Clinicians were alerted MSDH's testing capacity using the monthly MSDH MMR, publicizing with the Journal of the Mississippi State Medical Association, and providing hospital bases information sessions.

EQUINE TESTING - Veterinarians have also been encouraged to send serum samples to the state public health laboratory for equine cases of encephalitis, meningoencephalitis, or meningitis. All samples will be tested for WNV and EEE, free of charge.

MOSQUITO SURVEYS - the routine collection and identification of mosquitoes will be used to determine the geographic distribution and population density of all mosquitoes found in MS. Particular emphasis will be placed on those species known to be vectors for WNV and other arboviruses.

Mosquitoes are being collected throughout the state by the State Entomologist, Vector Disease Control Inc, (Greenville based), and Cleveland Mosquito Control, and Keesler Air Force Base. All information will be collected and assessed for use in surveillance strategies of the future.

MOSQUITO POOL TESTING - routine collection of mosquitos for the purpose of testing for WNV and other arboviruses. Mosquitos will be sent to the South Carolina Department of Environmental Conservation for testing.

Mosquitoes are being collected every other week by Vector Disease Control from May through October. Collections are being conducted in numerous counties throughout the state. In the event there is reasons to suspect arboviral activity in any region of the state, that area will be targeted for enhanced mosquito collection and testing.

WILD BIRD SERO-SURVEYS - Birds are the natural host and amplifier for WNV and other arboviruses. Routine collection of wild birds for the purpose of serum collection will be conducted from July to September. Samples will be tested for WNV and other arboviruses by the Florida Department of Health Public Health Laboratory.

Activities are being conducted by MSDH and The University of Southern Mississippi and a contract vector control agency. Collections occur regularly throughout the state. In the event there is reasons to suspect arboviral activity in a particlular region of the state, that area may be targeted for enhanced wild bird sampling and testing.

DEAD BIRD SURVIELLANCE - Certain bird species are highly susceptible to WNV, especially crows and blue jays. Thus, the reporting, collection, and testing of dead birds have been employed as a surveillance tool for WNV. Birds are shipped to the USGS National Wildlife Health Center in Wisconsin for WNV testing. Dead crows and blue jays are the only species collected for testing, but all other species should be reported.

The MSDH, in collaboration with the MS Board of Animal Health and the MS USDA division of APHIS has put in place a WNV Dead Bird Surveillance System. Field personnel with the named agencies have been provided with equipment and instructions regarding the collection of dead birds that are observed or reported.

All personnel with local MSDH offices, the Department of Wildlife Management and Parks, the MSU College of Veterinary Medicine, Military Bases, and Wildlife Rehabilitators, have been notified and asked to contact one of the participating agencies should a large bird die-off occur.

HOSPITAL BASED ACTIVE SURVEILLANCE - An active sentinel hospital surveillance system is currently in place to identify human arboviral cases. It was initiated in 1991 employing 9 hospitals, and has expanded to include 21 hospitals. Epidemiology nurses of the MSDH call the state-wide hospitals on a weekly basis from June to October. Established contacts, usually infection control nurses, are questioned regarding encephalitis, meningoencephaltis, and meningitis cases that were diagnosed during the preceding week. Questionable cases are followed-up to determine a diagnosis.

OTHER ACTIVITIES INCLUDE;

A coordinated response plan has been put in place should WNV or other arboviruses be detected within MS or the surrounding states. The MSDH will work in conjunction with hospitals, local health departments, mosquito control agencies, certain colleges and universities, the Board of Animal Health, and the media in an effort to educate the community and prevent the occurrence of human and animal disease. Enhanced surveillance will help to determine the extent and duration of activity.

The MSDH has designed an informative brochure and is creating media campaigns to increase awareness of WNV and other arboviruses. Information will include how the viruses are spread, how to decrease risk for infection, and clinical signs associated with infection. Pamphlets will be distributed through local health departments, or made available upon request. The MSDH website,www.msdh.state.ms.us/epi , offers similar information, as well as

updates on arbovirus activity in the state. The identification of activity will prompt the media department to broadcast health alerts, should the situation be deemed an emergency

The MSDH also employs the use of equines and ratites as a means of identifying EEE virus in the environment. Results from tests done through the Veterinary Diagnostic Laboratory (VDL) are sent directly to the MSDH. These reports will be used in addition to tests run by the state public health laboratory. The VDL routinely test for EEE, Western Equine encephalitis (WEE) and Venezuelan Equine encephalitis (VEE), and has recently added WNV. While there are no reports of either WEE or VEE ever occurring in MS, should they appear, veterinary laboratories may be the first to recognize. Epidemiologists follow-up on case reports with the attending veterinarian to identify clinical signs compatible with EEE, vaccination status, and anecdotal information. Information is compared with the state veterinarian to ensure all case reports are obtained from the diagnostic laboratory. Those identified as true cases are recorded, and followed as new cases arise. Geographic distribution, total number of cases, and rates for specific areas are means of determining if intervention measures are warranted. This is the first year this method of surveillance had been implemented. Communication between the agencies and veterinarians was excellent as was the transfer of information. Veterinarians responded to questionnaires in a complete and timely manner. Participating veterinarians were able to benefit from the system as well, through the dissemination of information back to them from the MSDH.

The MSDH subscribes to an information exchange website moderated by the CDC's, Division of Vector Borne Infectious Diseases. This forum provides the timely dissemination of vector, virus, and host activity among participating states and federal agencies. MSDH has also established direct links to arbovirus surveillance coordinators for states bordering MS, Louisiana, Alabama, Tennessee, and Arkansas. Sharing information with bordering states on a regular basis will keep all neighboring health departments up to date on potential arbovirus activity.

Most mosquito control in Mississippi involves spraying by municipal workers who perform this duty part time. In other words, city public works employees may work on streets or sidewalks during the day and drive mosquito spray trucks at night. In order to educate/train these municipal mosquito control personnel, the Mississippi Department of Health helps sponsor the "Mosquito Control Workshop" each year. In fact, the MSDH entomologist holds the position of Vice-President -- a recurring permanent position to provide continuity -- and coordinates much of the workshop each year. The target audience for the mosquito control workshop is anyone with mosquito control duties in the State of Mississippi. Each year, letters are sent to every mayor in Mississippi urging them to send their mosquito control person to the workshop. Attendance has generally been about 100 each year. This workshop has raised awareness of the importance of proper mosquito control, pesticide use, and mosquito-borne diseases in Mississippi.